Lightweight Ultrahigh Temperature CMC-Encased C/C Structure for Reentry and Hypersonic Applications, Phase I

Completed Technology Project (2005 - 2005)

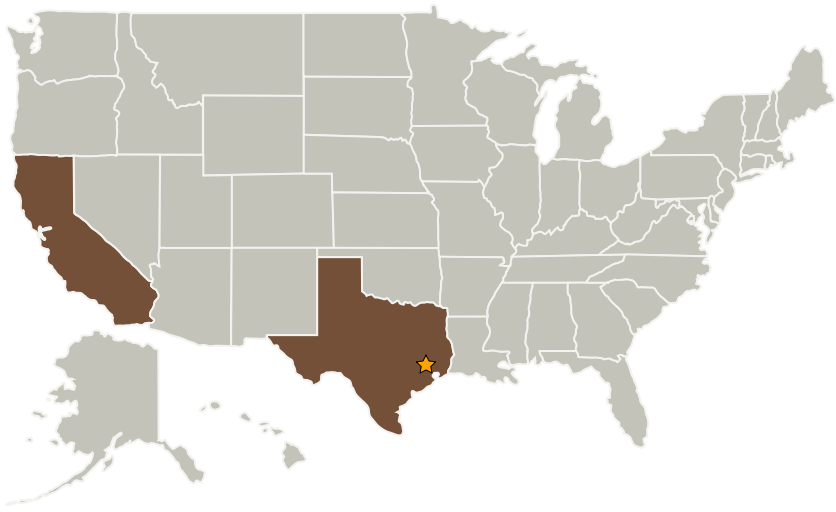
Project Introduction

The reentry spacecraft and hypersonic cruisers of the future will require advanced lightweight thermal protection systems that can provide the dual functionality of thermal protection and structural capability. In the proposed project, Ultramet will fabricate a lightweight, reusable, highly efficient, multifunctional, structurally robust thermal protection system consisting of a high thermal conductivity, porous carbon/carbon body encased in a high temperature capable (up to 4500

o

F) ceramic matrix composite skin. The proposed materials will not only be able to withstand the aggressive environments that are encountered during reentry or that are common to hypersonic vehicles, but they will also have the potential for structural capability when integrated efficiently with the main body of the aircraft. Through use of a cost-effective variant of Ultramet's innovative melt infiltration processing, the complexity and time required to fabricate the proposed thermal protection system elements to net shape will be reduced.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
Ultramet	Supporting Organization	Industry	Pacoima, California

Primary U.S. Work Locations	
California	Texas

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Project Manager:

Michelle L Mcnair

Principal Investigators:

Brenda Manuel
Gautham Ramachandran

Technology Areas

Primary:

- TX14 Thermal Management Systems
  - TX14.3 Thermal Protection Components and Systems
    - TX14.3.1 Thermal Protection Materials